April 28, 2000

MEMORANDUM

TO: Steve West, Assistant Administrator
Boise Regional Office

FROM: Bill Rogers, Air Quality Engineer BR
State Technical Services Office

SUBJECT: ***TIER II OPERATING PERMIT TECHNICAL ANALYSIS***
T2000002, EPSCO Corporation, Boise
(Abrasive Blasting, Powder Coating, and HVLP Spray Painting Facility)

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 16.01.01.400 (*Rules for the Control of Air Pollution in Idaho*) for issuing Tier II Operating Permits.

PROJECT DESCRIPTION

The EPSCO Corporation has submitted a Tier II Operating Permit (OP) application for an existing facility located in Boise, Idaho. The primary activities at the facility are abrasive blasting and industrial paint coating. The media used for abrasive blasting is either mineral abrasives, smelter slag, or steel shot. The industrial paint coating processes are electrostatic powder coating and high volume low pressure (HVLP) spray painting.

SUMMARY OF EVENTS

On May 5, 1999, DEQ received a Permit to Construct (PTC) application from the EPSCO Corporation. On June 15, 1999, the application was declared incomplete. On June 21, 1999, DEQ staff visited the facility to provide assistance in completing the required application materials. On June 25, 1999, DEQ received the items addressed in the incompleteness letter. On July 26, 1999, DEQ determined the application complete. On November 19, 1999, DEQ staff visited the facility and discovered the facility operated an HVLP spray painting process which was not included in the PTC application. On November 30, 1999, DEQ staff met with EPSCO staff and requested all Material Safety Data Sheets (MSDS) for all the paint products used at the facility. The requested MSDS's were received by DEQ on December 29, 1999. On January 12, 2000 DEQ informed EPSCO that the PTC application would be processed as a Tier II OP. The application was determined complete on February 18, 2000.

DISCUSSION

1. Abrasive Blasting

Abrasive blasting is used for a variety of surface cleaning and texturing operations, mostly involving metallic target materials. Sand is the most widely used blasting abrasive. Other abrasive materials include coal slag, smelter slag, mineral abrasives, metallic abrasives, and synthetic abrasives. Abrasive materials are generally classified as: sand, slag, metallic shot or grit, synthetic, or other. The cost and properties associated with the abrasive material dictate its application.

Silica sand is the most commonly used material for abrasive blasting where reclaiming is not feasible, such as in unconfined abrasive blasting operations. Sand has a rather high breakdown rate, which can result in substantial dust generation. Worker exposure to free crystalline silica is of concern when silica sand is used for abrasive blasting.

Coal and smelter slags are commonly used for abrasive blasting in shipyards. Slags have the advantage of low silica content, but have been documented to release other contaminants, including hazardous air pollutants into the air.

Metallic abrasives include case iron shot, cast iron grit, and steel shot. Cast iron shot is hard and brittle and is produced by spraying molten cast iron into a water bath. Cast iron grit is produced by crushing oversized and irregular particles formed during the manufacture of cast iron shot. Steel shot is produced by blowing molten steel. Steel shot is not as hard as cast iron shot, but is much more durable. These materials typically are reclaimed and reused.

Synthetic abrasives, such as silicon carbide and aluminum oxide, are becoming popular substitutes for sand. These abrasives are more durable and create less dust than sand. These materials are typically reclaimed and reused.

Other abrasives include mineral abrasives (such as garnet), cut plastic, glass beads, crushed glass, and nutshells. As with metallic and synthetic abrasives, these other abrasives are generally used in operations where the material is reclaimed. Mineral abrasives are reported to create significantly less dust than sand and slag abrasives.

Three basic methods can be used to project the abrasive towards the surface being cleaned: air pressure; centrifugal wheels; or water pressure. Air blast (or dry) systems use compressed air to propel the abrasive using either a suction-type or pressure-type process.[1] EPSCO's process is a dry suction-type process therefore only that process will be addressed in this analysis. EPSCO's abrasive blasting system consists of an abrasive container (i.e. blasting pot), an air compressor, and an abrasive blasting nozzle. In this system, two rubber hoses are connected to a blasting gun. One hose is connected to the compressed-air supply and the other is connected to the bottom of the blasting pot. The gun consists of an air nozzle that discharges into a larger nozzle. The high velocity air jet creates a partial vacuum in the chamber. This vacuum draws the abrasive into the outer nozzle and expels it through the discharge opening.

1.1 Blast Booth Equipment Listing and Stack Information

The blast booth has the following specifications:

Manufacturer:	Unknown
Booth Dimensions:	18' x 10' x 8'
Blast Media:	Smelter Slag, Steel Shot, Mineral Abrasive
Maximum Blasting Rate:	500 lb abrasive/hr

Emissions from the blast booth exit to the atmosphere out the filter box. The filter box contains two particulate filters that have a combined control efficiency of 98% for PM-10 size particulate matter. The stack parameters for the filter box, or vent, are:

Vent ID:	Blast Booth
Vent Height:	Ground Level
Vent Diameter:	18 inches
Vent Exit Gas Volume:	4500 acfm
Vent Exit Gas Temperature:	Ambient

[1] Abrasive Blasting, USEPA, Office of Air Quality Planning and Standards, AP-42 (Research Triangle Park, NC, 9/97), p. 13.2.6-1

1.2 Abrasive Blasting Emission Estimates

Because metallic and mineral abrasives have similar abrasive characteristics, hereinafter they are collectively identified as shot for the purposes of estimating emissions. The only other abrasive blasting media used is smelter slag. Smelter slag produces more dust than shot, therefore, it represents the worst case abrasive used in terms of PM-10 emissions. Its emission factor was used to determine the potential to emit (PTE) PM-10. As far as Toxic Air Pollutants (TAP's) are concerned, the MSDS submitted for smelter slag lists no toxic substance that is regulated by the state of Idaho as a TAP when emitted to the atmosphere.

Conversely, shot represents the worst case abrasive used in terms of TAP emissions. The MSDS's submitted identify five toxic metals and quartz, that, when emitted to the atmosphere, are regulated TAP's. EPA's AP-42 does list specific emission factors for TAP's from abrasive blasting operations. It does however list an emission factor for PM emissions that was used to estimate TAP emissions since the TAP's are solid phase matter (metals and quartz). TAP emissions were therefore estimated by multiplying the PM emission factor by the weight percent of each specific TAP.

The emission factors used to estimate potential PM-10 emissions and TAP's from the smelter slag and shot were obtained from AP-42, Section 13.2.6 (9/97). The emission estimates, MSDS's, and a copy of AP-42, Section 13.2.6 (9/97) are presented as Appendix A of this technical analysis. Table 1 summarizes the results of the emissions analysis.

Table 1. Abrasive Blast Booth Emission Estimates

CAS #	POLLUTANT	EMISSION RATE lb/hr	NET SCREENING EMISSION LEVEL (EL) lb/hr	POTENTIAL TO EMIT T/yr	TAP IDAPA 16.01.01.
NA	PM-10 (smelter slag)	0.05	NA	0.11	NA
NA	PM-10 (shot)	0.02	NA	smelter slag is limiting	NA
7439-89-6	Fe	0.019	0.067	0.04	585
7439-96-5	Mn	2.6E-04	0.333	5.8E-04	585
7440-21-3	Si	2.4E-04	0.667	5.4E-04	585
14808-60-7	quartz	1.0E-04	0.0067	2.2E-04	585
7440-47-3	Cr metal	5.0E-05	0.033	1.1E-04	585
7440-02-0	Ni	4.0E-05	2.7E-05	9.0E-05	586

As far as the TAP's are concerned, the only emission rate that exceeds its respective EL is that of nickel (Ni). Because the EL is exceeded, the emission rate was modeled to determine compliance or noncompliance with its acceptable ambient concentration (AACC). Using the results of the modeling analysis for the blast booth, the predicted impact for Ni emissions is shown to be less than its AACC, thereby demonstrating compliance.

The emission rates listed in Table 1 are controlled emissions. The blast booth is fully enclosed and double particulate filters filter the booth air before it's exhausted from the booth vent. The filters provide a combined PM-10 control efficiency of 98%. Per a directive from DEQ's Boise Regional Office, the high PM-10 background concentration in the Ada/Canyon County areas dictates that any new source or modification not exceed the ambient significant contribution for PM-10 as defined in the (*Rules*). This facility also includes one other PM-10 emitting source, the HVLP spray painting process. Because the facility cannot exceed the 24-hour and annual significant contribution for PM-10, which are 5.0 ug/m3 and 1.0 ug/m3, respectively, each process (abrasive blasting, HVLP painting) is allowed a PM-10 impact equal to one-half of the significant contribution of 2.5 ug/m3, 24-hr average, and 0.5 ug/m3, annual average.

With that in mind, modeling of the blast booth vent conservatively indicates the applicant can operate the blast booth for a maximum of twelve (12) hours per day and four thousand, four hundred eighty-five (4485) hr/yr while demonstrating compliance with one-half of the PM-10 significant contribution levels. Subsequently, PM-10 emissions are regulated in the permit on a daily and annual basis. The daily PM-10 emission rate limit is 0.60 lb/day (0.05 lb/hr x 12 hr/day) and the annual PM-10 emission rate limit is 0.11 T/yr (0.05 lb/hr x 4485 hr/yr x 1T/2000 lb). The time limitation applies only when the abrasive blasting gun is operating. The time limitation does not apply during preparation or clean-up. Compliance will be demonstrated by monitoring and recording the operating hours daily and monthly. Again, the emission estimates are based on the maximum abrasive blasting rate, therefore, the amount of blasting media does not have to monitored as it is inherently limited by the time limitation. Additionally, the Tier II OP requires the applicant to develop an Operations and Maintenance (O&M) Manual for the blast booth's particulate filters. Compliance will be demonstrated by monitoring and recording the filter replacements based on an the schedule outlined in the O&M Manual.

2. <u>Powder Coating Process Description</u>

Powder coating is dry paint as opposed to a medium dissolved or suspended in a liquid , such as solvent or water. The powder coating process involves a powder feeder unit, electrostatic powder spray gun, a voltage source, spray booth and curing ovens. An electrostatic charge is imparted on the powder at the powder gun. Compressed air is used to transfer the powder from the gun to the metal surface. The metal surface to be painted is grounded to complete the electrical circuit. The charged powder particles are then attracted to the grounded metal surface.

EPSCO's powder coating process is performed within an enclosed paint booth. DEQ staff visited the facility and observed the powder coating process, and based on observation, determined this source to be negligible for PM emissions. Additional supporting information is described below.

A January 1997 EPA document entitled *"Finishing Fabricated Metal Products with Powder Coating"* was reviewed for this analysis. Among other things, the document compares the transfer efficiency of powder coating processes versus that of conventional spray painting processes. According to the document, the transfer efficiency for powder coating processes ranges from 95 to 98% whereas the transfer efficiency of a conventional spray painting process is only 20 to 40%. Powder coating that does not adhere onto the metal surface simply falls to the floor where it is later swept up and recycled back into the process.

Powder coating systems eliminate the need for exhaust stacks because particulate matter emissions are not released into the environment. In addition, powder coatings do not contain VOC's or hazardous air pollutants (HAP's); therefore, these pollutant are not emitted into the environment. Because the powder coating process does not have a potential to emit, permit requirements do not apply.

3. HVLP Spray Painting Process

HVLP painting is performed in the same paint booth as powder coating. Some of the advantages of using an HVLP spray painting process versus other spray painting processes are: HVLP processes have higher transfer efficiencies; and due to lower air pressure, use less paint and produce less spray dust and overspray fog. All of which result in less pollutants emitted to the atmosphere.

Emissions from the paint booth vent were estimated using a spreadsheet. The regulated pollutants of concern are VOC's, PM-10, and TAP's. Section 3.1 lists the stack information for the HVLP booth. Section 3.2 describes how emissions were estimated.

3.1 HVLP Booth Equipment Listing and Stack Information

The HVLP booth has the following specifications:

Manufacturer:	Unknown
Booth Dimensions :	18' x 10' x 8'
Paint Products Used :	SEE SPREADSHEET PAGE 1 APPENDIX B
Maximum HVLP Painting Rate:	3.43 gal/hr

Emissions from the HVLP booth exit to the atmosphere out the filter box. The filter box contains two particulate filters that have a combined control efficiency of 98% for PM-10 size material. VOC emissions are uncontrolled. The parameters for the vent are as follows:

Vent ID:	HVLP Booth;
Vent Height:	Ground Level;
Vent Diameter:	24 inches;
Vent Exit Gas Volume:	7850 acfm;
Vent Exit Gas Temperature:	Ambient.

3.2 HVLP Spray Painting Emission Estimates

The spreadsheet developed to estimate emissions incorporates information contained in the MSDS's submitted by EPSCO for their HVLP paint inventory. The MSDS's provide the VOC content of the paint (lb VOC/gal), the paint density (total weight of paint, solids plus volatile (lb/gal)), the weight percent solids, and the weight percent HAP's (as TAP's). Only those toxic substances that are regulated as TAP's when emitted to the atmosphere are included in the spreadsheet. The spreadsheet consists of two pages and is presented as Appendix B of this document.

Referring to Page 1 of the spreadsheet, each paint product is identified by name, manufacturer number, product description (color or tint base), VOC content, and paint density. The TAP's contained in each paint product are identified by chemical name and by Chemical Abstract Service (CAS) number. The weight percent of each TAP is also listed.

The last column on the right-hand side of the spreadsheet lists the total content of each TAP for each row. For example, under the column, TAP-A TOTAL, toluene is listed as 3.32 lb/gal. That value was calculated by multiplying the VOC content of HI-TEMP STOVE BLACK (the only paint product in row A that contains toluene) by the weight percent toluene (6.27 lb VOC/gal x 0.53 lb toluene/lb VOC = 3.32 lb toluene/gal). Those TAP's that are contained in more than one paint product are simply summed across the row and the total listed in the last column. Xylene for example. In row B, quartz and mica are listed. These TAP's were quantified as the examples above, except that these TAP's are solids so the density and weight percent solids were used in place of VOC content. In row D, carbon black, silica, and calcium carbonate are listed. These TAP's are solids as well however the MSDS did not provided a weight percent solids value for them. They were calculated by using the density of the paint only.

Page 2 of Appendix B contains the total content of each TAP's from Page 1. The values listed under the columns labeled TAP CONTENT are simply the sum of each TAP from each row from Page 1. The column labeled TAP EMISSION RATE is the TAP CONTENT [lb/gal] multiplied by the HVLP maximum flowrate [gal/hr]. The emission rates for the PM-10 TAP's include the control efficiency of 98% for the particulate filters, a paint transfer efficiency of 92%, and a multiplier of 0.78 (AP-42) to convert PM to PM-10. VOC emissions are not controlled by a control device, such as a filter, in this process. Therefore, the TAP emission rates listed in the VOC portion of the spreadsheet are the TAP CONTENT multiplied by the HVLP maximum flowrate.

As with the abrasive blasting process, PM-10 emissions from the HVLP spray painting process are only allowed to be emitted up to one-half of the ambient PM-10 standards or 2.5 ug/m3, 24-hour average, and 0.5 ug/m3, annual average. Modeling the HVLP paint booth vent indicates that the HVLP spray paint process can operate 6.0 hr/day and 2,020 hr/yr and demonstrate compliance with the PM-10 ambient standards identified above.

The TAP EMISSION RATES do not include the hourly time restriction. That being the case, each TAP EMISSION RATE was compared to its respective EL. The emission rates that exceeded their EL were modeled and compared to their respective AAC. The MODELED 24-HR MAX predicted impacts include the hourly time restriction since that value is included in the permit as an enforceable requirement. As is indicated in the spreadsheet, none of the TAP's exceed their AAC's.

Finally, controlled PM-10 and VOC emissions were quantified for permit applicability. Neither PM-10 or VOC emissions are major. Likewise, TAP emissions are not major.

4. <u>Modeling</u>

Modeling of PM-10 emissions from the abrasive blast booth and HVLP paint booth was conducted using SCREEN3 modeling program. Based on the modeled results, the blast booth operations and HVLP painting operations require daily and annual limitation in order to meet the PM-10 ambient standards of 5.0 ug/m3, 24-hr average, and 1.0 ug/m3, annual average. The modeling results and calculations are presented in Appendices A and B of this technical analysis.

5. Facility Classification

The EPSCO Corporation is not a major facility as defined in IDAPA 16.01.01.006.55. The facility is not a designated facility as defined in IDAPA 16.01.01.006.27. The facility is not subject to any federal New Source Performance Standards (NSPS) in accordance with 40 CFR 60, National Emission Standards for Hazardous Air Pollutants (NESHAP) in accordance with 40 CFR 61, or National Emission Standards for Hazardous Air Pollutants for Source Categories (MACT) in accordance with 40 CFR 63. The Standard Industrial Classification (SIC) code defining this facility is 3479 (Coating of Metal Parts Not Elsewhere Classified), and the facility is classified A2.

6. Area Classification

The EPSCO Corporation is located in Boise, Idaho which is located in Air Quality Control Region (AQCR) 64 and Zone 11. This region is designated as nonattainment for CO and attainment or unclassifiable for all other regulated criteria air pollutants. Monitoring has shown the area has a high PM-10 background concentration. By directive of DEQ's Boise Regional Office, any new facility or modification is limited to PM-10 ambient impacts of 5.0 ug/m3, 24-hr average and 1.0 ug/m3, annual average.

7. Regulatory Review

The following is an explanation of the applicable air quality rules and regulations for the proposed project.

7.1 IDAPA 16.01.01.401 Tier II Operating Permit

The facility is an existing facility which requires a Tier II Operating Permit in accordance with IDAPA 16.01.01.401.03.

7.2 IDAPA 16.01.01.577 Ambient Air Quality Standards for Specific Air Pollutants

PM-10 emissions from the abrasive blast booth and HVLP spray paint booth have been modeled to demonstrate compliance with the significant contribution PM-10 ambient standards. Emissions from the powder coating system have been determined to be negligible and do not require specific regulation.

7.3 IDAPA 16.01.01.585 & 586 Non-Carcinogenic and Carcinogenic Toxic Air Pollutant Standards

TAP emissions have been estimated for the abrasive blasting process and HVLP spray painting process. Those TAP's which exceeded their respective net screening emission levels (EL's) were modeled to demonstrate compliance or non-compliance with their respective acceptable ambient concentrations (AAC's and AACC's). All TAP's are shown to demonstrate compliance with their applicable ambient concentrations.

8. Permit Requirements

The following Section outlines each Tier II OP requirement and the regulatory/technical basis.

8.1 Emission Limits

Controlled PM-10 lb/day and T/yr emission rate limits have been specified for the abrasive blast booth and HVLP spray paint booth. The emission rate limits are based on the hours of operation limitations determined through modeling. The emissions are the maximum allowable limits that demonstrate compliance with the PM-10 ambient standards identified in this document.

All stacks, vents, and other openings at this facility must comply with the opacity rules contained in IDAPA 16.01.01.625. In addition to the opacity requirement, any fugitive emissions generated from facility operations must not be seen crossing the facility boundary.

8.2 Operating Requirements

The abrasive blast booth and HVLP spray paint booth has daily and annual hours of operation limits which correspond to the PM-10 emission rate limits. The hours of operation limits were determined through modeling.

The facility is required to reasonably control fugitive emissions per IDAPA 16.01.01.651.

The facility is required to control their emissions of odorous gases per IDAPA 16.01.01.776.

Outdoor abrasive blasting is not allowed by this permit. The Permittee is required to obtain DEQ approval before any outdoor blasting occurs. Approval from DEQ may be that a permit is required.

The Permittee is not allowed to use any paint product with VOC contents or HAP contents greater than those listed in the MSDS's submitted in their permit application and upon which this analysis is based. Different paint manufacturers product can be used so long as the products adhere to the above limit.

8.3 Monitoring Requirements

The facility will be required to maintain a log of daily and monthly hours of operation of the abrasive blast booth and HVLP spray painting booth. Monitoring is not required on days where there is no use. Monthly monitoring is stated so that inspectors may be able to determine compliance for any 12-month period.

There were no requirements developed for the powder coating process. EPA research on powder coating operations have determined that VOC and PM emissions are negligible.

9. Permit Coordination

A draft copy of the Tier II OP and technical analysis was made available for public comment in accordance with IDAPA 16.01.01.404.01.c.

9. AIRS Information

Information necessary to the AIRS database is included as Attachment C of this Technical Memorandum.

FEES

This facility was required to obtain a Tier II Operating Permit by the Department for the purposes of fulfilling the requirements for a Permit to Construct. Consequently, the application fee of five hundred dollars ($500) is not applicable.

RECOMMENDATION

Based on review of application materials and all applicable state and federal rules and regulations, staff recommends that EPSCO Corporation be issued Tier II Operating Permit No. 001-00155 for their abrasive blasting and industrial coating facility located in Boise, Idaho. A public comment period is required in accordance with IDAPA 16.01.01.404.01.c.

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cc: DEQ State Office
Boise RO

APPENDIX A

Emission Estimates - Abrasive Blasting

EPSCO Corporation
T2-000002
April 2000

Abrasive Blasting Emission Estimate:

<u>PM-10 emissions from smelter slag</u> — AP-42

$\left(\frac{27 \text{ lb PM}}{1000 \text{ lb abrasive}}\right)(0.24) = 0.0065 \text{ lb PM/lb abrasive}$.

For this analysis, it is assumed PM-10 = 0.78 PM
→ AP-42 App B.1, 12.1

$\therefore \left(\frac{0.0065 \text{ lb PM}}{\text{lb abrasive}}\right)(0.78) = 0.005 \text{ lb PM-10/lb ab.}$

Maximum blasting rate = 500 lb/hr.

$\therefore \left(\frac{500 \text{ lb abrasive}}{\text{hr}}\right)\left(\frac{0.005 \text{ lb PM-10}}{\text{lb abrasive}}\right)(1-0.98) = 0.05 \text{ lb/hr}$
→ filter control %

PM-10 Ambient Standards = 5.0 $\mu g/m^3$ (24-hr Ave)
= 1.0 $\mu g/m^3$ (Annual Ave)

→ however, abrasive blasting is allowed ½ the standard because there is another source of PM-10 at the facility (HVLP Painting).

→ Determine allowable hours of operation that demonstrates compliance of the PM-10 Ambient standards.

From modeling, the max 1-hr impact is 244.1 $\frac{\mu g/m^3}{\text{lb/h}}$

Daily:

$$\left(244.1 \,\mu g/m^3\right)\left(0.05\, lb/hr\right)\left(0.4\right)\left(\frac{x}{24\, hr/day}\right) = 2.5\, \mu g/m^3$$

$$x = \frac{(24)(2.5)}{(244.1)(0.05)(0.4)} = \underline{12\ hr/day}$$

Annual:

$$\left(244.1\, \mu g/m^3\right)\left(0.05\right)\left(0.08\right)\left(\frac{x}{8760\, hr/yr}\right) = 0.5\, \mu g/m^3$$

$$x = \frac{(8760)(0.5)}{(244.1)(0.05)(0.08)} = \underline{4485\ hr/yr}$$

Potential To Emit:

$$\left(0.05\, lb/hr\right)\left(12\, hr/day\right) = 0.60\, lb\ PM\text{-}10/day$$

$$\left(0.05\, lb/hr\right)\left(4485\, hr/yr\right)\left(1\, T/2000\, lb\right) = 0.11\ T\ PM\text{-}10/yr.$$

TAP Analysis:

Emission Factor For shot – AP-42

$\left(27\ \text{lb}/1000\ \text{lb}\right)\left(0.1\right)\left(0.78\right) = 0.002\ \text{lb}/\text{lb}$ ala.

$\left(500\ \text{lb}/\text{hr}\right)\left(0.002\ \text{lb}/\text{lb}\right)\left(1-0.98\right) = 0.02\ \text{lb}/\text{hr}.$

From MSDS:

$\boxed{\text{EL lb/hr}}$

Fe 7439-89-6 $\left(0.02\ \text{lb}/\text{hr}\right)\left(96/100\right) = 0.019\ \text{lb}/\text{hr} < 0.067\ \text{lb}/\text{hr}$ OK

Mn 7439-96-5 $\left(0.02\right)\left(1.3/100\right) = 2.6\text{E-}04\ \text{lb}/\text{hr} < 0.333\ \text{lb}/\text{hr}$ OK

Si 7440-21-3 $\left(0.02\right)\left(1.2/100\right) = 2.4\text{E-}04\ \text{lb}/\text{hr} < 0.667\ \text{lb}/\text{hr}$ OK

quartz 14808-60-7 $\left(0.02\right)\left(0.5/100\right) = 1.0\text{E-}04\ \text{lb}/\text{hr} < 0.0067\ \text{lb}/\text{hr}$ OK

Cr 7440-47-3 $\left(0.02\right)\left(0.25/100\right) = 5.0\text{E-}05\ \text{lb}/\text{hr} < 0.033\ \text{lb}/\text{hr}.$

Ni 7440-02-0 $\left(0.02\right)\left(0.2/100\right) = 4.0\text{E-}05 > 2.7\text{E-}05$ MODEL

$\therefore \left(244.1\ \mu g/m^3\right)\left(4.0\text{E-}05\ \text{lb}/\text{hr}\right)\left(0.125\right)\left(\frac{4485}{8760}\right) = 6.2\text{E-}04\ \mu g/m^3$

$< 4.2\text{E-}03\ \mu g/m^3$

(AACC) OK

0
4/18/00
0
6:57:05

```
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

 T2000002 - EPSCO, Abrasive Blast Booth Stack


 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE               =        POINT
    EMISSION RATE (G/S)       =      .126000
    STACK HEIGHT (M)          =       1.8288
    STK INSIDE DIAM (M)       =        .6096
    STK EXIT VELOCITY (M/S)=         12.7501
    STK GAS EXIT TEMP (K)     =     293.1500
    AMBIENT AIR TEMP (K)      =     293.1500
    RECEPTOR HEIGHT (M)       =        .0000
    URBAN/RURAL OPTION        =        RURAL
    BUILDING HEIGHT (M)       =        .0000
    MIN HORIZ BLDG DIM (M)    =        .0000
    MAX HORIZ BLDG DIM (M)    =        .0000

 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


 BUOY. FLUX =      .000 M**4/S**3;  MOM. FLUX =    15.103 M**4/S**2.

 *** FULL METEOROLOGY ***

 **********************************
 *** SCREEN AUTOMATED DISTANCES ***
 **********************************

 *** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DIST
ANCES ***

   DIST     CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGM
A
    (M)   (UG/M**3)   STAB   (M/S)  (M/S)    (M)    HT (M)   Y (M)   Z (M
)  DWASH
 -------  ----------  ----   -----  -----  ------   ------  ------   -----
-  -----
     10.   39.32        4    20.0   20.0  6400.0    1.94     .98     .6
6    NO
```

```
     100.    81.10         4      5.0      5.0  1600.0     6.49     8.31     4.8
4     NO
     200.    65.44         5      4.0      4.0 10000.0     7.66    11.74     6.4
6     NO
     300.    76.91         5      1.0      1.0 10000.0    14.37    17.27     9.4
1     NO
     400.    80.36         6      1.0      1.0 10000.0    13.25    15.00     7.7
7     NO
     500.    82.65         6      1.0      1.0 10000.0    13.25    18.26     9.0
1     NO
     600.    78.83         6      1.0      1.0 10000.0    13.25    21.49    10.2
2     NO
     700.    72.59         6      1.0      1.0 10000.0    13.25    24.67    11.4
1     NO
     800.    65.69         6      1.0      1.0 10000.0    13.25    27.83    12.4
1     NO
     900.    59.32         6      1.0      1.0 10000.0    13.25    30.95    13.3
9     NO
    1000.    53.62         6      1.0      1.0 10000.0    13.25    34.04    14.3
3     NO

 MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    10. M:
      24.   244.1          4     20.0     20.0  6400.0     1.94     2.28     1.4
2     NO

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************

  CALCULATION         MAX CONC    DIST TO   TERRAIN
   PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
 --------------     -----------   -------   -------
 SIMPLE TERRAIN        244.1          24.        0.
```

13.2.6 Abrasive Blasting

13.2.6.1 General[1-2]

Abrasive blasting is the use of abrasive material to clean or texturize a material such as metal or masonry. Sand is the most widely used blasting abrasive. Other abrasive materials include coal slag, smelter slags, mineral abrasives, metallic abrasives, and synthetic abrasives. Industries that use abrasive blasting include the shipbuilding industry, automotive industry, and other industries that involve surface preparation and painting. The majority of shipyards no longer use sand for abrasive blasting because of concerns about silicosis, a condition caused by respiratory exposure to crystalline silica. In 1991, about 4.5 million tons of abrasives, including 2.5 million tons of sand, 1 million tons of coal slag, 500 thousand tons of smelter slag, and 500 thousand tons of other abrasives were used for domestic abrasive blasting operations.

13.2.6.2 Process Description[1-9]

Abrasive blasting systems typically include three essential components: an abrasive container (i. e., blasting pot); a propelling device; and a blasting nozzle or nozzles. The exact equipment used depends to a large extent on the specific application and type(s) of abrasive.

Three basic methods can be used to project the abrasive towards the surface being cleaned: air pressure; centrifugal wheels; or water pressure. Air blast (or dry) systems use compressed air to propel the abrasive using either a suction-type or pressure-type process. Centrifugal wheel systems use a rotating impeller to mechanically propel the abrasive by a combination of centrifugal and inertial forces. Finally, the water (or wet) blast method uses either air pressure or water pressure to propel an abrasive slurry towards the cleaned surface.

Abrasive materials used in blasting can generally be classified as sand, slag, metallic shot or grit, synthetic, or other. The cost and properties associated with the abrasive material dictate its application. The following discusses the general classes of commonly used abrasives.

Silica sand is commonly used for abrasive blasting where reclaiming is not feasible, such as in unconfined abrasive blasting operations. Sand has a rather high breakdown rate, which can result in substantial dust generation. Worker exposure to free crystalline silica is of concern when silica sand is used for abrasive blasting.

Coal and smelter slags are commonly used for abrasive blasting at shipyards. Black Beauty™, which consists of crushed slag from coal-fired utility boilers, is a commonly used slag. Slags have the advantage of low silica content, but have been documented to release other contaminants, including hazardous air pollutants (HAP), into the air.

Metallic abrasives include cast iron shot, cast iron grit, and steel shot. Cast iron shot is hard and brittle and is produced by spraying molten cast iron into a water bath. Cast iron grit is produced by crushing oversized and irregular particles formed during the manufacture of cast iron shot. Steel shot is produced by blowing molten steel. Steel shot is not as hard as cast iron shot, but is much more durable. These materials typically are reclaimed and reused.

Synthetic abrasives, such as silicon carbide and aluminum oxide, are becoming popular substitutes for sand. These abrasives are more durable and create less dust than sand. These materials typically are reclaimed and reused.

Other abrasives include mineral abrasives (such as garnet, olivine, and staurolite), cut plastic, glass beads, crushed glass, and nutshells. As with metallic and synthetic abrasives, these other abrasives are generally used in operations where the material is reclaimed. Mineral abrasives are reported to create significantly less dust than sand and slag abrasives.

The type of abrasive used in a particular application is usually specific to the blasting method. Dry blasting is usually done with sand, metallic grit or shot, aluminum oxide (alumina), or silicon carbide. Wet blasters are operated with either sand, glass beads, or other materials that remain suspended in water.

13.2.6.3 Emissions And Controls[1,3,5-11]

Emissions —

Particulate matter (PM) and particulate HAP are the major concerns relative to abrasive blasting. Table 13.2.6-1 presents total PM emission factors for abrasive blasting as a function of wind speed. Higher wind speeds increase emissions by enhanced ventilation of the process and by retardation of coarse particle deposition.

Table 13.2.6-1 also presents fine particulate emission factors for abrasive blasting. Emission factors are presented for PM-10 and PM-2.5, which denote particles equal to or smaller than 10 and 2.5 microns in aerodynamic diameter, respectively. Emissions of PM of these size fractions are not significantly wind-speed dependent. Table 13.2.6-1 also presents an emission factor for controlled emissions from an enclosed abrasive blasting operation controlled by a fabric filter; the blasting media was 30/40 mesh garnet.

Limited data from Reference 3 give a comparison of total PM emissions from abrasive blasting using various media. The study indicates that, on the basis of tons of abrasive used, total PM emissions from abrasive blasting using grit are about 24 percent of total PM emissions from abrasive blasting with sand. The study also indicates that total PM emissions from abrasive blasting using shot are about 10 percent of total PM emissions from abrasive blasting with sand.

Hazardous air pollutants, typically particulate metals, are emitted from some abrasive blasting operations. These emissions are dependent on both the abrasive material and the targeted surface.

Controls —

A number of different methods have been used to control the emissions from abrasive blasting. Theses methods include: blast enclosures; vacuum blasters; drapes; water curtains; wet blasting; and reclaim systems. Wet blasting controls include not only traditional wet blasting processes but also high pressure water blasting, high pressure water and abrasive blasting, and air and water abrasive blasting. For wet blasting, control efficiencies between 50 and 93 percent have been reported. Fabric filters are used to control emissions from enclosed abrasive blasting operations.

Table 13.2.6-1. PARTICULATE EMISSION FACTORS FOR ABRASIVE BLASTING[a]

EMISSION FACTOR RATING: E

Source	Particle size	Emission factor, lb/1,000 lb abrasive
Sand blasting of mild steel panels[b] (SCC 3-09-002-02)	Total PM	
	5 mph wind speed	27
	10 mph wind speed	55
	15 mph wind speed	91
	PM-10[c]	13
	PM-2.5[c]	1.3
Abrasive blasting of unspecified metal parts, controlled with a fabric filter[d] (SCC 3-09-002-04)	Total PM	0.69

a One lb/1,000 lb is equal to 1 kg/Mg. Factors represent uncontrolled emissions, unless noted. SCC = Source Classification Code.

b Reference 10.

c Emissions of PM-10 and PM-2.5 are not significantly wind-speed dependent.

d Reference 11. Abrasive blasting with garnet blast media.

References For Section 13.2.6

1. C. Cowherd and J. Kinsey, *Development Of Particulate And Hazardous Emission Factors For Outdoor Abrasive Blasting*, EPA Contract No. 68-D2-0159, Midwest Research Institute, Kansas City, MO, June 1995.

2. Written communication from J. D. Hansink, Barton Mines Corporation, Golden, CO, to Attendees of the American Waterways Shipyard Conference, Pedido Beach, AL, October 28, 1991.

3. South Coast Air Quality Management District, *Section 2: Unconfined Abrasive Blasting*, Draft Document, El Monte, CA, September 8, 1988.

4. A. W. Mallory, "Guidelines For Centrifugal Blast Cleaning", *J. Protective Coatings And Linings, 1(1)*, June 1984.

5. B. Baldwin, "Methods Of Dust-Free Abrasive Blast Clearing", *Plant Engineering, 32(4)*, February 16, 1978.

6. B. R Appleman and J. A. Bruno, Jr., "Evaluation Of Wet Blast Cleaning Units", *J. Protective Coatings And Linings, 2(8)*, August 1985.

7. M. K. Snyder and D. Bendersky, *Removal Of Lead-Based Bridge Paints*, NCHRP Report 265, Transportation Research Board, Washington, DC, December 1983.

8. J. A. Bruno, "Evaluation Of Wet Abrasive Blasting Equipment", *Proceedings Of The 2nd Annual International Bridge Conference*, Pittsburgh, PA, June 17-19, 1985.

9. J. S. Kinsey, *Assessment Of Outdoor Abrasive Blasting*, Interim Report, EPA Contract No. 68-02 4395, Work Assignment No. 29, U. S. Environmental Protection Agency, Research Triangle Park, NC, September 11, 1989.

10. J. S. Kinsey, S. Schliesser, P. Murowchick, and C. Cowherd, *Development Of Particulate Emission Factors For Uncontrolled Abrasive Blasting Operations*, EPA Contract No. 68-D2-0159, Midwest Research Institute, Kansas City, MO, February 1995.

11. *Summary Of Source Test Results, Poly Engineering, Richmond, CA*, Bay Area Air Quality Management District, San Francisco, CA, November 19, 1990.

12. *Emission Factor Documentation For AP-42 Section 13.2.6, Abrasive Blasting, Final Report*, Midwest Research Institute, Cary, NC, September 1997.

(406) 563-3433

105 N. Silver St.
Anaconda, MT 5971
FAX (406) 563-3435

Material Safety Data Sheet
May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

RDM MULTI-ENTERPRISES, INC.

IDENTITY (As Used on Label and List) Arbiter - Ferro Blast/Best Grit	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name: RDM Multi-Enterprises, Inc.	Emergency Telephone Number: (406) 494-5648
Address (Number, Street, City, State, ZIP Code): 105 N. Silver Street, Anaconda, MT 59711	Telephone Number for Information: 1-800-856-3433 (406) 563-3433
	Date Prepared: FEB 6 1998
	Signature of Preparer (optional)

Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TL	Other Limits Recommended	% (optional)
Cas No. 67711-92-6				

This product is a copper smelter slag with a mixture of the following elements (FE_2O_3, SiO_2, Al_2O_3, CaO, HgO) These are tightly bound in the glassy slag matrix, on OSHA PEL of 10 mg/m^3 and a ACGIH TLV of 5 mg/m^3 for dust is applicable. Other elements are also present in the product as a complex mixture tightly bound in the glassy slag matrix but in concentrations of less than 0.1%.

Section III - Physical/Chemical Characteristic

Boiling Point	N/A	Specific Gravity (H_2O = 1)	3.26
Vapor Pressure (mm Hg.)	N/A	Melting Point	2000° F
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/AP

Solubility in Water: None

Appearance and Odor: Black-Colored, amorphous; glass-like solids; odorless

Section IV -- Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
N/A	N/AP		

Extinguishing Media: This material is noncombustible

Special Fire Fighting Procedures: Firefighters will need respiratory protection under dusty condtions

Unusual Fire and Explosion Hazards: This material is nonflammable and non explosive

Section V - Reactivity Data

Stability			Conditions to Avoid
	Unstable		UK
	Stable	X	

Incompatibility (Materials to Avoid) Strong Acids

Hazardous Decomposition or Byproducts

Hazardous Polymerization			Conditions to Avoid
	May Occur		UK
	Will Not Occur	X	

Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
	Yes	Not Expected to be Absorbed	Yes

Health Hazards (Acute and Chronic) Keep nuisance dust levels below TLV for nuisance dust (5mg/m³)

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
	No	No	Yes

Signs and Symptoms of Exposure None - the dust is inert and nonfibrogenic.

Medical Conditions Generally Aggravated by Exposure Nuisance dust

Emergency and First Aid Procedures Eye contact - Wash eyes with water to flush out dust particles.

Skin contact - Wash affected area with soap and water.

Section - VII Precautions for Safe Handling and Use

Steps to BE Taken in Case Material is Released or Spilled Sweep or vacuum material for disposal. Provide clean up crews with proper protective equipment under dusty conditions.

Waste Disposal Method Perform TCLP Pest and dispose of in accordance with federal, state and local regulations

Precautions to Be Taken in Handling and Storing Good housekeeping should be practiced during storage, transfer, handling and use of this material to avoid excessive dust.

Other Precautions Avoid eye/skin contact and prolonged or repeated breathing of dust. Use good personal hygiene practices. Wash hands with plenty of soap and water before eating, drinking, smoking, or use of toilet facilities.

Section VIII - Control Measures

Respiratory Protection (Specify Type) NIOSH/MSHA approved particulate filter respirator.

Ventilation				
	Local Exhaust	Use when conducting blasting	Special	None
	Mechanical (General)	Use to meet TLV requirements if dust is generated	Other	None

Protective Gloves		Eye Protection	
	Yes - to prevent cuts and abrasions		Use safety glasses with side shields or chemical type goggles

Other Protective Clothing or Equipment Use hearing protectors whenever abrasive blasting generates excessive noise.

Work/Hygienic Practices Same as nuisance dust precautions.

U.S. G.P.O.: 1986-491-529/45775

MATERIAL SAFETY DATA SHEET

I - PRODUCT IDENTIFICATION:

Manufacturer's Name:	Address:		
Ervin Industries, Inc.	3893 Research Park Drive	Telephone:	(734) 769-4600
Amasteel Division	Ann Arbor, MI 48108-2217	FAX:	(734) 663-0136

D-U-N-S NO.: 00-533-7735, 00-504-3708, 07-499-7677

PRODUCT NAMES:	Amasteel Shot, Amabrasive, Amasteel Grit, Amasteel	Common Name:	Cast Steel
		Chemical Family:	Ferrous

II - HAZARDOUS COMPONENTS:

CAS REGISTRY NO.	% WEIGHT	CHEMICAL NAME	ACGIH TLV (mg/m^3)	OSHA PEL (mg/m^3)
7439-89-6 ~~7439-89-6~~ ~~[illegible]~~	>96	Iron		
		Oxide fume, as Fe	5	10
7440-44-0	0.8-1.3	Carbon	none estab.	none estab.
7439-96-5	0.5-1.3	Manganese		
		Elemental and Inorganic compounds, as Mn	0.2	5 (ceiling)
		Fume - as Mn	none estab.	5 (ceiling)
7440-21-3	0.3-1.2	Silicon		
		as total dust	10	15
		Respirable fraction	none estab.	5
7440-47-3	<0.25	Chromium		
		Elemental metal and Inorganic compounds as Cr metal	0.5	1
		Cr II compounds - as Cr	none estab.	0.5
		Cr III compounds - as Cr	0.5	0.5
		Cr VI compounds - water Soluble	0.05	none estab.
		Cr VI compounds - insoluble	0.01	none estab.
		Chromic Acid and Chromates as CrO_3	none estab.	0.1 (ceiling)
		Chromium salts - Insoluble - as Cr	none estab.	1
7440-02-0	<0.2	Nickel		
		elemental metal, insoluble compounds as Ni	0.05	1
		soluble compounds as Ni	0.05	1

III - PHYSICAL DATA:

Cast steel shot and grit are non-hazardous as received. Fine metallic dust is generated as the abrasive breaks down from impact and wear during normal use. Since the ferrous content is >96%, dust or fumes will consist mainly of iron or iron oxide. In addition, the fine steel dust created can be a mild explosion hazard (see IV).

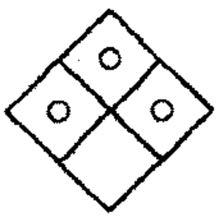
Boiling Point - 2850-3150 Degrees C
Specific Gravity(at 60 degrees F)->7.6
% Volatile by volume-Not Applicable
Evaporation Rate-Not Applicable
Solubility in Water-Not Applicable
Melting Point-1371-1483 Degree C
Vapor Pressure-Not Applicable
pH - Not Applicable
Vapor Density-Not Applicable
Percent Solid by Weight-100%
Appearance and Odor - Near spherical or angular steel particles with no odor

IV - FIRE AND EXPLOSION HAZARD DATA:

Flash Point - Not Applicable
Flammability Limits-Not Applicable
Autoignition Temperature (solid iron exposed to oxygen) -930 Degrees C
Cast steel shot and grit will not burn or explode
A mild fire or explosion hazard situation may be created due to the <u>fine dust that may result from use</u>.
Fire Extinguishing method for dust created due to use - use Class D extinguishing agents or dry sand to exclude air. Do not use water or other liquids, or foam.

NFPA49

NFPA Hazard Rating



4 = Extreme	Health (blue)	0
3 = High	Flammability (red)	0
2 = Moderate	Reactivity (yellow)	0
1 = Slight	Special (colorless)	
0 = Insignificant		

V - HEALTH HAZARD DATA:

Threshold Limit Values - Permissible Exposure Limits - see Section II

Carcinogenicity - OSHA, not listed. IARC, chromium [VI] - carcinogenic to humans (Group 1), metallic chromium and chromium [III] compounds - not classifiable as to their carcinogenicity to humans (Group 3); nickel compounds are carcinogenic to humans, metallic nickel is possibly carcinogenic to humans (Group 2B).
Fumes can be generated by welding or flame cutting a surface containing new or used abrasive or the dust created by use of the abrasive. Welding or flame cutting may convert a small portion of the chromium to hexavalent chromium [VI]. IARC reports that welding fumes are possibly carcinogenic to humans.
Over exposure to dust and fumes may cause mouth, eye, and nose irritation. Prolonged overexposure to manganese dust or fume affects the central nervous system. Chronic overexposure can cause manganese poisoning, and attendant apathy, loss of appetite, uncontrolled laughter, insomnia followed by sleepiness, headache, difficulty in walking, frequent falling, tremors, salivation sweating and mental detachment.
Prolonged overexposure to iron oxide fume can cause siderosis, or "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability.

V - HEALTH HAZARD DATA: (continued)

Target Organs - Lung for chromium and lung and nasal for Nickel.
Primary Routes of entry - inhalation of dust formed during use, or shot, grit or dust particles in eyes.

Emergency and First Aid Procedure - If inhaled, move out of area into fresh air. Flush eyes with running water, have any remaining particles removed from eyes by qualified medical person.

VI - REACTIVITY DATA:

Stability - stable Hazardous Polymerization - will not occur
Hazardous decomposition products - None. Shot and grit will break down into progressively smaller particles and dust during normal use.

VII - SPILL OR LEAK PROCEDURES:

Shot spilled or leaked onto floors can create hazardous walking conditions. No special precautions need to be followed when cleaning up spills or leaks of shot or grit. When cleaning up large quantities of dust, a NIOSH approved respirator should be used. Spilled shot and grit can be reclaimed for reuse, or disposed of as a non-hazardous solid waste. Collected dust from blast cleaning or shot peening operations always contains contaminants from the surfaces of the parts being processed, and therefore the dust may be classed as a hazardous waste and, as such, must be disposed of according to appropriate local, State or Federal regulations.

VIII - SPECIAL PROTECTION INFORMATION:

Ventilation - General ventilation and local exhaust should be provided to keep the dust levels below the TLV's shown in Section II.

Respiratory protection - If the dust created by use exceeds the ACGIH TLV's and OSHA PEL's indicated in Section II, a NIOSH approved respirator should be worn.

Eye protection - Approved safety glasses with eye shields should be worn.
Other protective equipment - none required.

IX - SPECIAL PRECAUTIONS:

Precautions to be taken in handling and storing - Keep dry to reduce rusting. Observe maximum floor loading limitations.
Other precautions - The company has no control over this product or its use after it leaves our facility. The company assumes no liability for loss or damage incurred from the proper or improper use of this product.

The information presented here has been compiled from sources considered to be reliable and accurate to the best of our knowledge and belief, but is not guaranteed to be so.

Prepared by: David A. Hale Manager, Technical Services

ABRASIVE
MSDS's

EMERALD
CREEK
GARNET

Making Our Environment Cleaner

MATERIAL SAFETY DATA SHEET

Complies with 29 CFR 1910.1200

IDENTITY (As Used on Label and List)

Emerald Creek Garnet Abrasive Grains and Powders

SECTION I

Manufacturer's Name: EMERALD CREEK GARNET COMPANY

Emergency Telephone Number: (208) 245-2096

Address (Street, City, State, Zip Code)

P.O. Box 190
Fernwood, ID 83830

Telephone Number Information

(208) 245-2096
January 15, 1994
L. E. Gorrill 1/15/94

SECTION II- Hazardous Ingredients / Identity Information

Hazardous Components:
Specific Chemical Identity: OSHA PEL ACGIH TLV Other Limits Recommended %(Optional)

Emerald Creek Garnet is a natural mixture of almandite garnet - $Fe_3Al_2(SiO_4)_3$ with Mg and Mn in partial substitution for Fe in the formula, and other minerals. The following substances are present and are regulated by OSHA or ACGIH limits: CAS # 1302-62-1

SUBSTANCE	WT. %	OSHA/ACGIH LIMIT IN USE*
Nuisance dust	na	15 mg/cu.m.
Respirable dust	na	5 mg/cu.m.
Crystalline silica	<0.50%	0.10 mg/cu.m.

* If these levels are exceeded respiratory protection must be employed.

SECTION III - Physical and Chemical Characteristics

Melting Point: Circa 1315° C

Specific Gravity (H_2 = 1.0): 4.0 - 4.1

Solubility in Water: Insoluble

Appearance and Odor: Deep red to pink color; no odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash point (Method Used): Material is a non-flammable solid

Flammable Limits: not applicable | LEL: na | UEL: na

Extinguishing media

Use extinguishing media appropriate for the surrounding fire.

Special Fire Fighting Procedures

As appropriate to the surrounding fire. Firefighters should be protected from nuisance dust.

Unusual Fire and Explosion Hazards

None

SECTION V - Reactivity data

Stability — Unstable [ ] / Stable [x]: INERT

Conditions to Avoid: Almandite garnet is an inert, stable solid needing no special handling in normal use.

Incompatibility (Materials to Avoid): NONE KNOWN

Hazardous Decomposition or ByProducts: NONE KNOWN

Hazardous Polymerization — May occur [ ] / Will not occur [x]

Conditions to Avoid: NONE KNOW

SECTION VI - HEALTH HAZARD DATA

Routes(s) of Entry	Inhalation?	Skin?	Ingestion?
	POSSIBLE	NONE	NONE

Health Hazards (Acute and Chronic)

None known. use care to limit possible exposure to nuisance dust during blast cleaning.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulations
Crystalline silica (quartz) contains less than 0.5%		No. 42 na	0.1 mg/m^3

Signs and Symptoms of Exposure

Exposure to nuisance dust may cause eye, throat, or lung irritation, coughing, or shortness of breath.

Medical Conditions Generally Aggravated by Exposure

Chronic bronchitis, emphysema and other lung diseases may be aggravated by exposure to nuisance dust.

Emergency and First Aid Procedures

EYE CONTACT: Wash eyes with water to flush out dust particles.
SKIN CONTACT: Wash affected area with soap and water.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in Case Material is Released or Spilled

NO SPECIAL PRECAUTIONS ARE NECESSARY. Sweep or vacuum material for disposal. Prevent generation of dust during clean-up.

Waste Disposal Methods

Follow local, state, and federal guidelines for disposal of inert solid waste.

MATERIAL CONTAMINATED IN USE MAY REQUIRE SPECIAL HANDLING

Precautions to be taken in Handling and Storing

NONE - Use good housekeeping practices to reduce dust; use approved hand, eye, and respiratory protection when handling material.

Other Precautions

Use material ONLY for the purposes intended, and incorporate methods of dust control to maintain airborne dust within federal or local TLV limits.

SECTION VIII - CONTROL MEASURES

Respiratory Protection (Specify Type)

NIOSH/MSHA approved filters and air supplied hoods for blasters.

Ventilation: YES

Local Exhaust	Special
Use when blast cleaning	NONE
Mechanical (General)	**Other**
Meet dust TLV	NONE

Protective Gloves: Leather or equivalent - in use

Eye Protection: Safety glasses with side shields

Other Protective Clothing or Equipment

Hearing protection when working near blast cleaning operation.

Work/Hygienic Practices

Maintain a clean and safe work environment & monitor work practices.

APPENDIX B

Emission Estimates - HVLP Spray Painting

EPSCO Corporation
T2-000002
April 2000

T2000002 | EPSCO

Modeling : HVLP Only

SCREEN3 max 1-hr = 246.4 ug/m³/lb.hr.

From spreadsheet page 2, max PM-10 TAP emission Rate = 0.11 lb/hr.

PM-10 standards : 2.5 ug/m³, 24-hr
0.5 ug/m³, annual.

Max daily operating hours:

$$(246.4\ \mu g/m^3)(0.11\ lb/hr)(0.4)\left(\frac{x}{24\ hr/day}\right) = 2.5\ \mu g/m^3$$

$$x = \frac{(24)(2.5)}{(246.4)(0.11)(0.4)} = 6.0\ hr/day$$

Annual:

$$(246.4\ \mu g/m^3)(0.11\ lb/hr)(0.08)\left(\frac{x}{8760\ hr/day}\right) = 0.5\ \mu g/m^3$$

$$x = \frac{(8760)(0.5)}{(246.4)(0.11)(0.08)} = 2020\ hr/yr.$$

Potential to Emit (Permit Limits) : PM-10 Only –

$$(0.11\ lb/hr)(6\ hr/day)(1\ day/24\ hr) = 0.03\ lb/day$$

$$(0.11\ lb/hr)(2020\ hr/yr)(1\ T/2000\ lb) = 0.11\ T/yr.$$

0

4/18/00

0

6:55:51

```
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

 T2000002 - EPSCO, Paint Booth Stack


 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE             =        POINT
    EMISSION RATE (G/S)     =      .126000
    STACK HEIGHT (M)        =       1.8288
    STK INSIDE DIAM (M)     =        .4572
    STK EXIT VELOCITY (M/S)=       12.8931
    STK GAS EXIT TEMP (K)   =     293.1500
    AMBIENT AIR TEMP (K)    =     293.1500
    RECEPTOR HEIGHT (M)     =        .0000
    URBAN/RURAL OPTION      =        RURAL
    BUILDING HEIGHT (M)     =        .0000
    MIN HORIZ BLDG DIM (M) =         .0000
    MAX HORIZ BLDG DIM (M) =         .0000

 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


 BUOY. FLUX =      .000 M**4/S**3;  MOM. FLUX =    8.687 M**4/S**2.

 *** FULL METEOROLOGY ***

 **********************************
 *** SCREEN AUTOMATED DISTANCES ***
 **********************************

 *** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DIST
ANCES ***

   DIST     CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGM
A
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M
)  DWASH
 -------  ----------  ----  -----  -----  ------  ------  ------  -----
-  -----
     10.   37.71        4    20.0   20.0  6400.0    1.93     .97     .6
5    NO
```

```
     100.    121.2        5     5.0     5.0 10000.0    5.37    6.21    3.6
8     NO
     200.    103.1        6     4.0     4.0 10000.0    6.25    7.83    4.2
8     NO
     300.    107.3        6     1.0     1.0 10000.0   11.33   11.56    6.2
5     NO
     400.    115.9        6     1.0     1.0 10000.0   11.33   14.89    7.5
5     NO
     500.    109.7        6     1.0     1.0 10000.0   11.33   18.17    8.8
2     NO
     600.    98.80        6     1.0     1.0 10000.0   11.33   21.41   10.0
6     NO
     700.    87.28        6     1.0     1.0 10000.0   11.33   24.61   11.2
6     NO
     800.    76.87        6     1.0     1.0 10000.0   11.33   27.77   12.2
8     NO
     900.    67.97        6     1.0     1.0 10000.0   11.33   30.90   13.2
6     NO
    1000.    60.43        6     1.0     1.0 10000.0   11.33   33.99   14.2
1     NO

 MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    10. M:
      24.    246.4        4    20.0    20.0  6400.0    1.93    2.27    1.4
1     NO

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************

  CALCULATION           MAX CONC     DIST TO    TERRAIN
   PROCEDURE           (UG/M**3)     MAX (M)     HT (M)
 --------------       -----------    -------    -------
 SIMPLE TERRAIN         246.4           24.         0.
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MSDS INFORMATION FOR PAINT PRODUCTS USED

PAGE 1

		HI TEMP STOVE BLK	TILE-CLAD HS Epoxy									
		51H200	B62WZ101	B62WZ102	B62WZ103	B62TZ104	B62BZ11	B62RZ38	B62WZ100	B62YZ37	B60DVZ70	TAP-A
A		Flat Black	White	Midtone Base	Deeptone Base	Ultradeep Base	Black	Safety Red	Safety White	Safety Yellow	Hardener	TOTAL
CAS No.	TAP ID	% by wt	% by wt	% by wt	% by wt	% by wt	% by wt	% by wt	% by wt	% by wt	% by wt	lb/gal
107-21-1	ethylene glycol	0.00	2.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.33
100-41-4	ethylbenzene	0.00	1.00	2.00	2.00	2.00	2.00	2.00	1.00	2.00	3.00	0.55
1330-20-7	xylene	12.00	8.00	9.00	10.00	11.00	9.00	9.00	7.00	8.00	19.00	3.64
25551-13-7	trimethylbenzene	0.00	4.00	5.00	4.00	5.00	5.00	6.00	4.00	3.00	9.00	1.45
111-76-2	2-butoxyethanol	0.00	3.00	3.00	3.00	4.00	3.00	4.00	3.00	3.00	0.00	0.85
108-88-3	toluene	53.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.32
71-36-3	n-butyl alcohol	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
1309-37-1	iron oxide	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
	VOC CONTENT (lb/gal)	6.27	3.18	3.28	3.28	3.26	3.27	3.27	3.18	3.28	3.06	
	DENSITY (lb/gal)	6.07	12.65	11.41	10.54	9.90	10.60	10.02	13.10	10.89	8.75	

		EPOXY COATINGS													
		B62W401	B62T404	B60V70	B62S100	B60V100	B62A213	B62H200	B-62L200	B62W201	B60V20	B62L7	B62W7	B60V7	TAP-B
B		White	Midtone Base	Hardener	Part A	Part B	Slate Gray	Beige	Blue	Pure White	Part B Hardener	Part P Lt. Blue	Part P White	Part O Hardener	TOTAL
CAS No.	TAP ID	%by wt	%by wt	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	lb/gal
100-41-4	ethylbenzene	3.00	4.00	3.00	1.00	2.00	3.00	3.00	3.00	3.00	0.00	3.00	3.00	2.00	0.96
1330-20-7	xylene	17.00	20.00	16.00	7.00	9.00	18.00	14.00	14.00	19.00	0.00	18.00	18.00	13.00	5.31
25551-13-7	trimethylbenzene	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52
111-76-2	2-butoxyethanol	5.00	6.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	24.00	0.00	0.00	0.00	1.17
14808-60-7	quartz	0.00	20.00	0.00	33.00	56.00	0.00	30.00	28.00	0.00	0.00	35.00	35.00	11.00	26.71
12001-26-2	mica	0.00	0.00	0.00	0.00	0.00	16.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	2.10
	VOC CONTENT (lb/gal)	3.30	3.30	3.99	1.45	1.39	2.96	2.87	2.87	3.00	1.87	2.99	2.99	1.96	
	DENSITY (lb/gal)	13.19	11.02	8.48	12.36	13.36	12.47	13.00	13.22	12.82	7.95	14.09	14.09	12.39	
	WEIGHT % SOLIDS	75.00	70.00	52.90	88.30	89.60	75.90	77.90	78.30	76.20	76.40	78.80	78.80	85.00	

		KEM 400 ENAMEL									
		F75KX	F75W403	F75V404	F75B401	E61A400	E61R402	F75S491	V66V1020	V70V411	TAP-C
C		Custom	White Base	Clear Base	Gloss Black	Gray Primer	Rd. Oxide Prmr	Silver Metallic	Catalyst	Acrylic Modifier	TOTAL
CAS No.	TAP ID	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	%by wt.	lb/gal
100-41-4	ethylbenzene	7.00	6.00	7.00	6.00	8.00	6.00	7.00	0.00	5.00	2.57
1330-20-7	xylene	42.00	36.00	39.00	36.00	21.00	21.00	42.00	0.00	30.00	12.54
25551-13-7	trimethylbenzene	1.00	0.00	1.00	0.00	0.00	3.00	3.00	7.00	0.00	0.72
123-86-4	n-butyl acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.00	0.00	1.25
108-65-6	1-methoxy-2-propanol acetate	5.00	0.00	0.00	0.00	0.00	0.00	0.00	19.00	0.00	1.12
822-06-0	hexamethylene diisocyanate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
4098-71-9	isopherone diisocyanate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	VOC CONTENT (lb/gal)	4.90	4.77	4.95	4.96	4.94	5.06	4.94	4.62	2.92	
	DENSITY (lb/gal)	9.20	9.33	7.74	7.76	8.25	9.90	7.93	8.37	8.35	

		TILE-CLAD II ENAMEL					DTM BONDING PRIMER	CHEM-THANE HARDENER		
		B62W101	B62W102	B62W103	B62T104	B62B11			SU-84	TAP-D
D		Pure White	Midtone Base	Deeptone Base	Ultradeep Base	Black	B66A50	CT-300	THINNER	TOTAL
CAS No.	TAP ID	%by wt	%by wt	%by wt	%by wt	%by wt	%by wt	%by wt	%by wt	lb/gal
107-21-1	ethylene glycol	5.00	5.00	5.00	5.00	0.00	1.00	0.00	0.00	0.80
100-41-4	ethylbenzene	2.00	2.00	2.00	3.00	2.00	0.00	0.00	0.00	0.44
1330-20-7	xylene	10.00	12.00	12.00	16.00	11.00	0.00	28.00	0.00	4.04
98-82-8	cumene	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.06
25551-13-7	trimethylbenzene	12.00	12.00	12.00	17.00	17.00	0.00	0.00	0.00	2.83
111-76-2	2-butoxymethanol	4.00	5.00	5.00	6.00	7.00	0.00	0.00	0.00	1.09
1333-86-4	carbon black	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.16
NA	silica	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.06
13765-19-0	calcium carbonate	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.04
123-86-4	n-butyl acetate	0.00	0.00	0.00	0.00	0.00	0.00	7.00	0.00	0.39
78-93-3	methyl ethyl ketone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	3.75
	VOC CONTENT (lb/gal)	3.89	3.89	3.91	4.31	4.07	0.43	5.64	7.50	
	DENSITY (lb/gal)	11.15	10.52	10.20	9.14	9.54	11.20	8.30	0.00	

HVLP PAINT BOOTH EMISSION ESTIMATES BASED ON MSDS INFORMATION

PAGE 2

HVLP maximum flowrate (gal/hr)	3.43		SCREEN3			
			246.4	ug/m3		
			0.246	mg/m3		
TAP-A,B,C,D						
TOTAL						
	TAP	TAP	EL	MODELED	AAC	
	CONTENT	EMISSION RATE		24-HR MAX		COMPLIANCE?
PM-10	lb/gal	lb/hr	lb/hr	mg/m3	mg/m3	
carbon black	0.16280	0.00059	0.23000		0.17500	
silica	0.06450	0.00023	0.66700		0.50000	
calcium carbonate	0.03870	0.00014	0.66700		0.50000	
iron oxide	0.08070	0.00029	0.33300		0.25000	
quartz	26.71486	0.09676	0.00670	0.00238	0.00500	YES
mica	2.10049	0.00761	0.20000		0.15000	
HOURLY PM-10		0.10563	lb/hr			
HOURLY PM-10 (controlled)		0.02641	lb/hr			
ANNUAL PM-10 (controlled)		0.10668	T/yr			
	TAP	TAP	EL	MODELED	AAC	
	CONTENT	EMISSION RATE		24-HR MAX		COMPLIANCE?
VOC's	lb/gal	lb/hr	lb/hr	mg/m3	mg/m3	
methyl ethyl ketone	3.75000	12.86250	39.30000		29.50000	
ethylene glycol	1.12970	3.87487	0.84600	0.09532	6.35000	YES
ethylbenzene	4.51840	15.49811	29.00000		21.75000	
xylene	25.53780	87.59465	29.00000	2.15483	21.75000	YES
trimethylbenzene	5.51410	18.91336	8.20000	0.46527	6.15000	YES
2-butoxyethanol	3.10530	10.65118	8.00000	0.26202	6.00000	YES
toluene	3.32310	11.39823	25.00000		18.75000	
n-butyl alcohol	0.50160	1.72049	10.00000		7.50000	
n-butyl acetate	1.64220	5.63275	47.30000		35.50000	
1-methoxy-2-proanol acetate	1.12280	3.85120	24.00000		3.60000	
hexamethylene diisocyanate	0.00139	0.00475	0.00200	0.00012	0.00150	YES
isopherone diisocyanate	0.00046	0.00158	0.00600		0.00450	
HOURLY VOC (uncontrolled)		172.00369	lb/hr			
HOURLY VOC (controlled)		43.00092	lb/hr			
ANNUAL VOC (controlled)		43.43093	T/yr			

Note: HVLP painting is limited to 6.0 hr/day to protect the 24-hr PM-10 ambient standard. Subsequently, hourly VOC emissions are inherently limited by the 6.0 hr/day limit. Annual HVLP painting is limited to 2,020 hr/yr to protect the annual PM-10 ambient standard. All annual emissions are limited by the 2,020 hr/yr limit.

APPENDIX C

AIRS Information

EPSCO Corporation
T2-000002
April 2000

ABBREVIATED AIRS DATA ENTRY SHEET

Name of Facility: EPSCO Corporation

AIRS/Permit #: 001-00155

Permit Issue Date: May 5, 2000

*Source/Emissions Unit Name (25 spcs) (Please use name as indicated in permit)	SCC # (8 digit #)	Air Program (SIP/NESHAP/ NSPS/PSD)
*General Painting	40200110	SIP
Abrasive Blasting	40202599	SIP

RETURN TO PAT RAYNE

AIRS-PT.LST (3/99)